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Structure of copper(II) complexes grown from ionic liquids - 1-ethyl-3-methylimidazolium acetate or chloride

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Abstract

© Serov et al. 2018. Crystals of four new copper(II) complexes have been grown from copper(II) acetate/chloride-1-ethyl-3-methylimidazolium acetate/chloride-water systems and characterized by X-ray analysis. The first complex, bis(1-ethyl-3-methylimidazolium) tetra-μ-aceta-o-bis[chloridocuprate(II)], [Emim]2[Cu2(C2H3O2)4Cl2] (1) (Emim is 1-ethyl-3-methylimidazolium, C6H11N2), contains [Cu2(C2H3O2)4Cl2]2-coordination anions with a paddle-wheel structure and ionic liquid cations. Two of the synthesized complexes are one-dimensional polymers, namely catena-poly[1-ethyl-3-methylimidazolium [[tetra-μ-aceta-o-dicuprate(II)]-μ-chlorido] monohydrate], {[Emim][Cu2(C2H3O2)4Cl]·H2O} n (2), and catena-poly[1-ethyl-3-methylimidazolium [[tetra-μ-acetato-dicuprate(II)]-μ-acetato]], {[Emim][Cu2(C2H3O2)5]}n(3). In these compounds, the Cu2(C2H3O2)4units with a paddle-wheel structure are connected to each other through chloride (in 2) or acetate (in 3) anions to form parallel chains, between which cations of ionic liquid are situated. The last compound, bis(1-ethyl-3-methylimidazolium) tetra-μ-acetato-bis[aquacopper(II)] tetra-μ-aceta-o-bis[acetatocuprate(II)] dihydrate, [Emim]2[Cu2(C2H3O2)4(H2O)2][Cu2(C2H3O2)6]·2H2O (4), contains two different binuclear coordination units (neutral and anionic), connected through hydrogen bonds between water molecules and acetate ions.

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Keywords

copper(II) complexes, crystal structure, ionic liquids, paddle-wheel

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